



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/788,589	02/27/2004	Ronald S. Karr	VRT0120US	6846
60429	7590	11/06/2006	EXAMINER	
CSA LLP 4807 SPICEWOOD SPRINGS RD. BLDG. 4, SUITE 201 AUSTIN, TX 78759			KIM, DANIEL Y	
		ART UNIT	PAPER NUMBER	
			2185	

DATE MAILED: 11/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)
	10/788,589	KARR ET AL.
	Examiner Daniel Kim	Art Unit 2185

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 16 October 2006.  
 2a) This action is FINAL.                            2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1,2 and 4-26 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1,2 and 4-26 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on 27 February 2004 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

*SCE*  
STEPHEN C. ELMORE  
PRIMARY EXAMINER

#### Attachment(s)

1) Notice of References Cited (PTO-892)  
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) Information Disclosure Statement(s) (PTO/SB/08)  
 Paper No(s)/Mail Date \_\_\_\_\_.  
 4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date \_\_\_\_\_.  
 5) Notice of Informal Patent Application  
 6) Other: \_\_\_\_\_.

***Response to Arguments***

1. Applicant's arguments filed October 16, 2006 have been fully considered, and the examiner has determined some of these arguments to be persuasive.

Regarding the argument that Satran does not teach tags are included in first and second write transactions generated by the computer system, the examiner respectfully disagrees.

Applicant argues limitations presumably supported by the specification, but not accurately reflected by the language of the claims. The rejection of record fully teaches the claimed limitations to the extent they are actually claimed.

Particularly, applicant argues that tags are not included within first and second write transactions generated by a computer system. As defined by the applicant, an IO transaction, when generated, may utilize configuration map(s) to access data of one or more storages, and read or write data accordingly (par. 0010-0012). Satran teaches these limitations, utilizing tags to indicate which data is engaged in an open data transaction and the state of the transaction (col. 2, lines 61-63; col. 5, lines 10-11, 66-67; col. 6, lines 7-8).

The applicant argues that because these tags are stored within a translation table, the tags are not included within the transactions generated by the computer system as required by these claims. The claim language, however, does not define the scope so as to exclude the possibility that tags may be retrieved from another part of the system to be used with the data transaction. By another interpretation, since tags

are being retrieved in Satran to be used with the other data accessed in the transaction, the tag may be said to be included in the transaction.

Therefore, in response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., write transactions including first and second tags) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Regarding the argument that Satran or any other combination of the prior art of record fails to teach first and seconds tags relate the first write transaction to the second write transaction, where this language, based on what the examiner can gather from applicant's specification, is assumed to mean the first and second tags are identical to one another (par. 0033), the examiner agrees, and the finality of the last Office Action is withdrawn. A new ground(s) of rejection is provided as detailed below.

#### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-2, 4-6, 13, 15-18, 20-21 and 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Satran et al (US Patent No. 6,668,304) in view of Wang et al (US Patent No. 6,834,326).

For claim 1, Satran discloses a method comprising:

a computer system generating first and second write transactions (an improved system for supporting data transactions, col. 2, lines 61-63);  
wherein the first and second write transactions comprise first and second tags, respectively (tags indicate which of the data blocks is currently engaged in an open data transaction, col. 5, lines 10-11; one or more data fields include a tag indicative of a state of the data transaction, col. 5, lines 66-67; the data transaction comprises a plurality of concurrent data transactions, col. 6, lines 7-8);

the computer system transmitting the first and second write transactions to first and second storage devices, respectively (one or more storage devices are used for storing data contents of transactions initiated by one or more clients of the storage devices, col. 3, lines 1-3).

Satran fails to disclose the remaining claim limitations.

Wang, however, helps disclose each of the first and second tags relate the first write transaction to the second write transaction (in mirrored writes, all the disks must write the same data; the RAID controller will multicast the command and the data to be written; in both read and write, all packets contain the same transaction ID, which is unique to that RAID volume, col. 12, lines 36-42);

wherein the first write transaction comprises data D to be written (col. 12, lines 36-42);

wherein the second write transaction comprises data D to be written (col. 12, lines 36-42).

Satran and Wang are analogous art in that they are of the same field of endeavor, that is, a system and/or method of memory control. Wang suggests the desirability of providing RAID 1 (mirroring) to improve the performance and reliability of storage devices attached to a storage server on a network (col. 3, lines 25-60; col. 4, lines 30-52) by giving strong protection against disk failure, as well as optimizing reads and writes for storing data (col. 11, lines 63-67).

Wang also suggests that it would have been desirable to incorporate tags relating mirrored write transactions to one another into the system of Satran because this would help uniquely identify all data related to the same RAID volume (col. 12, lines 36-42), as taught by Wang. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Satran to incorporate the RAID 1 mirroring system of Wang for the benefits as suggested by Wang to create an improved storage system resulting in the combination Satran in view of Wang.

Claim 2 is rejected using the same rationale as for the rejection of claim 1 above.

For claim 4, the combined teachings of Satran and Wang disclose the invention as per rejection of claim 1 above.

Satran further helps disclose the first storage device receiving the first write transaction (at least one transaction supporting logical disk which is adapted to receive data, col. 4, lines 42-44);

the first storage device storing in an entry of a first tag table, the first tag and an identity of the logical block where data D is to be written, wherein the first tag table is stored in first memory (storing the one or more data structures includes storing a translation table which maps logical block addresses of the succession of data blocks to respective physical addresses and which tags which of the data blocks is currently engaged in an open data transaction, col. 6, lines 54-58; storing in at least one volatile memory one or more data structures containing data indicative of one or more properties of at least some of the data blocks, and writing at least some of the data that are in the data structures to the at least one transaction supporting logical disk, so that the contents of the at least one volatile memory can be regenerated from the at least some of the data in the one or more data structures that are stored in the at least one transaction supporting logical disk, col. 6, lines 46-53)

the second storage device receiving the second write transaction (col. 4, lines 42-44);

the second storage device storing in an entry of a second tag table, the second tag and an identity of the logical block where data D is to be written, wherein the second tag table is stored in second memory (col. 6, lines 46-58).

Claim 5 is rejected using the same rationale as in the rejection of claims 1 and 4 above.

Claim 6 is rejected using the same rationale as in the rejection of claims 1 and 4 above.

For claim 13, the combined teachings of Satran and Wang disclose the invention as per rejection of claim 1 above.

Satran and Wang further help disclose the first write transaction comprises data D to be written to an extension of a first storage object (Satran: performing a recovery operation includes determining a state of an open transaction to query the state and decide whether to commit or abort the open transaction, col. 8, lines 11-14);

the second write transaction comprises data D to be written to an extension of a second storage object (Satran: col. 8, lines 11-14; Wang: col. 12, lines 36-42).

For claim 15, Satran discloses generating first and second write transactions (col. 2, lines 61-63);

wherein the first and second write transactions comprises first and second tags, respectively (col. 5, lines 10-11, 66-67);

the computer system transmitting the first and second write transactions to first and second storage devices, respectively (col. 3, lines 1-4).

Satran fails to disclose the remaining claim limitations.

Wang, however, helps disclose the first and second tags are identical to each other (col. 12, lines 36-42);

wherein the first write transaction comprises data D (col. 12, lines 36-42);

wherein the second write transaction comprises data D (col. 12, lines 36-42).

Satran and Wang are analogous art in that they are of the same field of endeavor, that is, a system and/or method of memory control. Wang suggests the desirability of providing RAID 1 (mirroring) to improve the performance and reliability of storage devices attached to a storage server on a network (col. 3, lines 25-60; col. 4, lines 30-52) by giving strong protection against disk failure, as well as optimizing reads and writes for storing data (col. 11, lines 63-67).

Wang also suggests that it would have been desirable to incorporate tags relating mirrored write transactions to one another into the system of Satran because this would help uniquely identify all data related to the same RAID volume (col. 12, lines 36-42), as taught by Wang. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Satran to incorporate the RAID 1 mirroring system of Wang for the benefits as suggested by Wang to create an improved storage system resulting in the combination Satran in view of Wang.

Claim 16 is rejected using the combined rationale as for the rejection of claims 1-2 above.

For claim 17, Satran discloses a computer readable medium storing instructions executable by a computer system, wherein the computer system implements a method in response to executing the instructions (a computer software product for performing a data transaction, including a computer-readable medium having program instructions recorded therein, with instructions to be read by a computer, col. 9, lines 4-26), the method comprising:

generating first and second write transactions (col. 2, lines 61-63);

wherein the first and second write transactions comprises first and second tags, respectively (col. 5, lines 10-11, 66-67);

transmitting the first and second write transactions directly or indirectly to first and second storage devices, respectively (col. 3, lines 1-4).

Satran fails to disclose the remaining claim limitations.

Wang, however, helps disclose each of the first and second tags relate the first write transaction to the second write transaction (col. 12, lines 36-42);

wherein the first write transaction comprises data D to be written (col. 12, lines 36-42);

wherein the second write transaction comprises data D to be written (col. 12, lines 36-42).

Satran and Wang are analogous art in that they are of the same field of endeavor, that is, a system and/or method of memory control. Wang suggests the desirability of providing RAID 1 (mirroring) to improve the performance and reliability of storage devices attached to a storage server on a network (col. 3, lines 25-60; col. 4, lines 30-52) by giving strong protection against disk failure, as well as optimizing reads and writes for storing data (col. 11, lines 63-67).

Wang also suggests that it would have been desirable to incorporate tags relating mirrored write transactions to one another into the system of Satran because this would help uniquely identify all data related to the same RAID volume (col. 12, lines 36-42), as taught by Wang. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Satran to incorporate the

RAID 1 mirroring system of Wang for the benefits as suggested by Wang to create an improved storage system resulting in the combination Satran in view of Wang.

Claim 18 is rejected using the combined rationale as in the rejection of claims 1-2 and 17 above.

Claim 20 is rejected using the combined rationale as in the rejection of claims 5 and 17 above.

Claim 21 is rejected using the same rationale as for the rejection of claims 15 and 17 above.

Claim 24 is rejected using the same rationale as for the rejections of claims 13 and 17 above.

For claim 25, Satran discloses a computer readable medium storing instructions executable by a computer system, wherein the computer system implements a method in response to executing the instructions (col. 9, lines 4-26), the method comprising:

generating first and second write transactions (col. 2, lines 61-63);

wherein the first and second write transactions comprises first and second tags, respectively (col. 5, lines 10-11, 66-67);

the computer system transmitting the first and second write transactions to first and second storage devices, respectively (col. 3, lines 1-4).

Satran fails to disclose the remaining claim limitations.

Wang, however, helps disclose the first write transaction comprises data D (col. 12, lines 36-42);

the second write transaction comprises data D (col. 12, lines 36-42).

Satran and Wang are analogous art in that they are of the same field of endeavor, that is, a system and/or method of memory control. Wang suggests the desirability of providing RAID 1 (mirroring) to improve the performance and reliability of storage devices attached to a storage server on a network (col. 3, lines 25-60; col. 4, lines 30-52) by giving strong protection against disk failure, as well as optimizing reads and writes for storing data (col. 11, lines 63-67).

Wang also suggests that it would have been desirable to incorporate mirrored write transactions into the system of Satran because this gives strong protection against disk failure and also help improve performance in I/O-laden systems (col. 4, lines 46-55), as taught by Wang. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Satran to incorporate the RAID 1 mirroring system of Wang for the benefits as suggested by Wang to create an improved storage system resulting in the combination Satran in view of Wang.

For claim 26, Satran discloses a computer readable medium storing instructions executable by a computer system, wherein the computer system implements a method in response to executing the instructions (col. 9, lines 4-26), the method comprising:

in response to receiving a first transaction comprising a first tag, storing in an entry of a first tag table, the first tag and an identity of a logical block where the data is to be written, wherein the first tag table is stored in first memory (col. 6, lines 54-58, col. 6, lines 46-53);

a second storage device receiving the second write transaction (col. 6, lines 54-58, col. 6, lines 46-53);

the second storage device storing in an entry of a second tag table, the second tag and an identity of the logical block where data is to be written, wherein the second tag table is stored in second memory (col. 6, lines 54-58, col. 6, lines 46-53).

Satran fails to disclose the remaining claim limitations.

Wang, however, helps disclose the first tag corresponds to a second tag of a second write transaction (col. 12, lines 36-42);

and both first and second write transactions comprise data D to be written (col. 12, lines 36-42).

Satran and Wang are analogous art in that they are of the same field of endeavor, that is, a system and/or method of memory control. Wang suggests the desirability of providing RAID 1 (mirroring) to improve the performance and reliability of storage devices attached to a storage server on a network (col. 3, lines 25-60; col. 4, lines 30-52) by giving strong protection against disk failure, as well as optimizing reads and writes for storing data (col. 11, lines 63-67).

Wang also suggests that it would have been desirable to incorporate mirrored write transactions into the system of Satran because this gives strong protection against disk failure and also help improve performance in I/O-laden systems (col. 4, lines 46-55), as taught by Wang. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Satran to incorporate the RAID 1 mirroring system of Wang for the benefits as suggested by Wang to create an improved storage system resulting in the combination Satran in view of Wang.

4. Claims 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Satran et al (US Patent No. 6,668,304) in view of Wang et al (US Patent No. 6,834,326) and further in view of Gaither et al (US PGPub No. 20040098544).

For claim 7, the combined teachings of Satran and Wang disclose the invention as per rejection of claim 4 above.

These teachings fail to disclose the limitations of claim 7.

Gaither, however, helps disclose comparing the contents of one entry in the first tag table with the contents of entries in the second tag table to determine whether the second tag table includes an entry that matches the one entry (a virtual compression system may be configured to identify units of memory that share identical content among a plurality of partitions, par. 0031; a copy counter may be associated with each entry in a page partition table, and when a new identical page has been determined, the copy counter may be incremented for each entry that references the matching page across the partitions, par. 0032).

Satran, Wang and Gaither are analogous art in that they are of the same field of endeavor, that is, a system and/or method of memory control. Gaither suggests that it would have been desirable to incorporate comparing entries for a match in content into the system of Satran and Wang because otherwise, many of the mass storage partitions may contain duplicate information (par. 0003), and updating respective partition page tables that reference matching pages accordingly may optimize memory systems across partitions (par. 0025). Therefore, it would have been obvious to a

person of ordinary skill in the art at the time the invention was made to modify Satran and Wang as suggested by Gaither to incorporate the feature as claimed.

For claim 8, the combined teachings of Satran, Wang and Gaither disclose the invention as per rejection of claim 7 above.

Gaither further helps disclose copying data, associated with the logical block number identified by the one entry, from the first storage object to the logical block in the second storage object if the second table lacks an entry with contents matching the contents of the one entry (the controller may copy the contents of the matching page to the requested page and forward the requested data to the memory system to perform the write operation, par. 0060).

For claim 9, the combined teachings of Satran, Wang and Gaither disclose the invention as per rejection of claim 7 above.

Gaither further helps disclose deleting the one entry in the first table if the second table contains an entry with contents that match the contents of the one entry (any mapping to duplicate pages is removed and the duplicate pages are returned to a free page pool, which is maintained by the virtual compression system, par. 0019).

Claim 10 is rejected using the combined rationale as in the rejection of claim 9 above.

5. Claims 11-12, 14 and 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Satran et al (US Patent No. 6,668,304) in view of Wang et al (US Patent No. 6,834,326) and further in view of Mattis et al (US Patent No. 6,128,627).

For claim 11, the combined teachings of Satran and Wang disclose the invention as per rejection of claim 1 above.

These teachings fail to disclose the limitations of claim 11.

Mattis, however, helps disclose the computer system generating a write transaction to write data to a logical block of a data volume; the computer system incrementing a counter in response to generating the write transaction (if a matching block is not currently in the process of being created or destroyed, then the block can be used, and the process increments a write counter, which is an internal variable, stored in association with the block, that indicates the number of processor or programmatic objects that are writing the block, col. 34, lines 52-58);

the computer system generating the first and second tags, wherein each of the first and second tags relate to the first and second write transactions, respectively, wherein the first and second tags are generated in response to generation of the write transaction, and wherein the first and second tags are generated as a function of an output of the incremented counter.

Satran, Wang and Mattis are analogous art in that they are of the same field of endeavor, that is, a system and/or method of memory control. Mattis suggests that it would have been desirable to incorporate a write counter into the system of Satran and Wang because this would indicate the number of processor or programmatic objects that are writing the block (col. 34, lines 56-58). Therefore, it would have been obvious to

a person of ordinary skill in the art at the time the invention was made to modify Satran and Wang as suggested by Mattis to incorporate the feature as claimed.

For claim 12, the combined teachings of Satran, Wang and Mattis disclose the invention as per rejection of claim 11 above.

Mattis further helps disclose the first and second storage devices comprise first and second object storage devices (a cache of information objects comprising a directory table that indexes each of the information objects in one of a plurality of buckets, col. 5, lines 66-67, col. 6, lines 1-2).

Claim 14 is rejected using the combined rationale as in the rejection of claims 1 and 12-13 above.

Claim 22 is rejected using the combined rationale as in the rejection of claims 11 and 17 above.

Claim 23 is rejected using the combined rationale as in the rejection of claims 12 and 17 above.

#### ***Contact Information***

6. Any inquiries concerning this action or earlier actions from the examiner should be directed to Daniel Kim, reachable at 571-272-2742, on Mon-Fri from 10:00am-6:30pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sanjiv Shah, is also reachable at 571-272-4098.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information from

Art Unit: 2185

published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. All questions regarding access to the Private PAIR system should be directed to the Electronic Business Center (EBC), reachable at 866-217-9197.

DK

10-31-06

*S.C. Elmore*  
STEPHEN C. ELMORE  
PRIMARY EXAMINER